

IN THE CLAIMS:

Please amend claims 38-46; please cancel claims 17-37 and 47; and please add new claims 48-63, as follows. All claims are set forth for convenient reference.

*Please cancel claims 17-37.*

1 38. (Amended) An article comprising:  
2 a substrate; and  
3 a layer disposed over the substrate, the layer comprising a highly tetrahedral  
4 amorphous carbon having more than about 15%  $sp^3$  carbon-carbon bonds and a single peak  
5 Raman spectrum, the layer further comprising at least one of hydrogen and nitrogen.

1 39. (Amended) An article as in claim 38, wherein the layer comprises  
2 between about 8 and 18 atomic percent hydrogen.

1 40. (Amended) An article as in claim 38, wherein the layer comprises  
2 between about 4 and 30 atomic percent nitrogen.

1 41. (Amended) An article as in claim 40, wherein electrical conductivity of  
2 the layer varies with the nitrogen percentage.

1 42. (Amended) An article as in claim 41, wherein the electrical  
2 conductivity of the layer varies by 5 orders of magnitude.

1 43. (Amended) An article as in claim 38, wherein the  $sp^3$  carbon-carbon  
2 bonds are stable at about 700°C.

1 44. (Amended) An article as in claim 38, wherein the layer is smooth and  
2 continuous.

1 45. (Amended) An article as in claim 38, wherein the layer comprises more  
2 than about 35%  $sp^3$  carbon-carbon bonds.

1 46. (Amended) An article as in claim 38, wherein the layer comprises more  
2 than about 70%  $sp^3$  carbon-carbon bonds.

[Please cancel claim 47.]

1 48. (New) An article as in claim 38, wherein the single peak Raman spectrum  
2 has a maximum peak intensity at about 1518  $cm^{-1}$ .

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11/49. (New) An article as in claim 48, wherein the maximum peak intensity is associated with a G-peak.

12/50. (New) An article as in claim 38, wherein the single peak Raman spectrum has a width of about  $175 \text{ cm}^{-1}$ .

13/51. (New) An article as in claim 38, wherein the single peak Raman spectrum is characterized by a generally smooth curve.

14/52. (New) An article as in claim 51, further comprising at least one localized secondary perturbation offset from the generally smooth curve.

15/53. (New) An article as in claim 38, wherein the layer has a thickness of less than about  $75 \text{ \AA}$ .

16/54. (New) An article as in claim 38, wherein the layer has a thickness of less than about  $50 \text{ \AA}$ .

17/55. (New) An article as in claim 38, wherein the layer has a hardness of over about  $50 \text{ GPa}$ .

18/56. (New) An article as in claim 38, wherein the layer has a hardness of about  $80 \text{ GPa}$ .

19/57. (New) An article as in claim 38, wherein the layer has a density of more than about  $2.5 \text{ g/cm}^3$ .

20/58. (New) An article as in claim 38, wherein the layer does not include macroparticles.

50/59. (New) An article as in claim 38, wherein the  $\text{sp}^3$  carbon-carbon bonds are at least in part formed by directing an energized stream of carbon ions having a uniform weight toward the substrate.

60. (New) An article as in claim 38, wherein the  $\text{sp}^3$  carbon-carbon bonds are at least in part formed by directing an energized stream of carbon ions having a substantially uniform impact energy toward the substrate.

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61. (New) An article as in claim 38, wherein the  $sp^3$  carbon-carbon bonds are at least in part formed by directing an energized stream of carbon ions toward the substrate with an ion impact energy between about 100 and 120 eV for each carbon atom.

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62. (New) An article comprising:  
a substrate; and  
a layer disposed over the substrate, the layer comprising a highly tetrahedral amorphous carbon having more than about 15%  $sp^3$  carbon-carbon bonds and a carbon bonding pattern characterized by a single peak Raman spectrum.

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63. (New) An article comprising:  
a substrate; and  
a layer disposed over the substrate, the layer comprising a highly tetrahedral amorphous carbon having more than about 15%  $sp^3$  carbon-carbon bonds and a carbon bonding pattern being free from a D-peak Raman spectrum.--

IN THE DRAWINGS:

(N.C.) In Fig. 8, please insert the following reference numerals, as shown in red ink on an enclosed copy of the submitted drawing:

--200--, --202--, --204--, and --206--.